

Finite mixture of Burr type XII distribution and its reciprocal: properties and applications

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Abstract In this paper, the finite mixture of Burr type XII distribution with its reciprocal, is proposed as a failure model. The failure rate (FR) of the new model covers several types of failure rates. It is shown that depending on the parameter values, the model is capable of covering different combinations of failure rates. A study of the behavior of the FR curve of the model is made.

Keywords Burr type XII · Burr type III · Failure rate · Mixture distribution

1 Introduction

Mixtures of life distributions occur when two different causes of failure are present each with the same parametric form of life distributions. Finite mixtures of distributions have been used as models throughout the history of modern statistics. For more details about finite mixture of distributions see, [Everitt and Hand \(1981\)](#) and [McLachlan and Peel \(2000\)](#), among others.

In life testing and reliability studies, each failure can often be classified into more than one type of failure. That is, the underlying failure time distribution need not be homogeneous. It can be a mixture of two distinct lifetime distributions due to two different failure models. In this article, a finite mixture of Burr type XII distribution

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